In the United States Patent and Trademark Office

Applicant:	Oxaal, Ford
Application No.:	10/602,666
Filing Date:	6/25/2003
Examiner:	Yang, Ryan R.
Title:	Method for Interactively Viewing Full-Surround Image Data and Apparatus Therefore
Art Unit:	2628
Docket No.:	GRND-24C

RULE 132 DECLARATION REGARDING APPLICATION 10/602,666

Commissioner for Patents
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Sir:

1. I am Nicholas Murphy, residing at Long Hill House, Long Hill, The Sands, Surrey, GU10 1NQ, United Kingdom.

2. I received the degree of BSc (Hons) in Electrical and Electronic Engineering, i.e. Bachelor of Science with Honors, from The University of Surrey in 1985.

3. I am currently the Vice President of Architecture for 3Dlabs Ltd. I have 20 years of experience of 3D graphics, and I am very knowledgeable on computer graphics and 3D computer modeling. 3Dlabs Ltd is active in this technology area, so I am constantly exposed to current developments in 3D graphics.

4. I have reviewed US Patent 5,684,937 to Ford Oxaal (hereafter "the '937 Patent"), filed June 7, 1995, which is incorporated by reference in the above-identified application.

5. The '937 Patent, at col 9, discusses a C-like pseudo-code describing texture mapping. In lay terms, according to the discussion, for every pixel position in the output image a corresponding point in 3D object space specified by spherical coordinate (theta, phi) is calculated, which is then used to look up a pixel color in a color table, the input image. This is an example of texture mapping.

6. The '937 Patent meets definitions of texture mapping as defined by the following:

> Texture mapping means the mapping of a function onto a surface in 3-D. The domain of the function can be one, two, or three-dimensional, and it can be represented by either an array or by a mathematical function.
> Heckbert, Paul; "Survey of Texture Mapping"; p. 1;
> http://www.cs.cmu.edu/~ph/texsurv.pdf.
>
> and
>
> The mapping from texture space to screen space is split into two phases, as shown in figure 1. First is the surface parameterization that maps texture space to object space, followed by the standard modelling and viewing transformations that map object space to screen space, typically with a perspective projection [Fol82]. These two mappings are composed to find the overall 2-D texture space to 2-D screen space mapping, and the intermediate 3-D space is often

> forgotten. This simplification suggests texture mapping's close ties with image warping and geometric distortion.
> Heckbert, Paul; "Survey of Texture Mapping"; p. 2;
> http://www.cs.cmu.edu/~ph/texsurv.pdf.

7. The '937 Patent discusses application of the forementioned algorithm to six separate flat images that together form a cube. This describes a particular form of texture mapping known as cube mapping, and as such supports the equivalence of the MEV algorithm to texture mapping. Cube mapping is discussed widely in the literature, for example:

> A 2D texture maps a 2D texture coordinate set to a color in a single texture image. In contrast, you access a cube map texture with a three-component texture coordinate set that represents a 3D direction vector.
>
> Think of this vector as a ray originating from the center of the cube. As the ray shoots outward, it will intersect one of the six cube map faces. The result of a cube map texture access is the filtered color at that point of intersection with one of the six texture images.
>
> Cube map textures are ideal for environment mapping. Each face of the cube map encodes one-sixth of the panoramic environment around an object. A cube map texture provides a quick way to determine what the object centered within that environment would "see" in any particular direction.
> http://www.developer.com/lang/other/article.php/2169281

8. Cube mapping is a specific case of environment texture mapping and one skilled in the art will recognize that the technique described is equally applicable to sphere or polyhedral mapping.

9. Additionally, Claim 9 of the '937 Patent claims texture mapping within a system. According to Claim 9, an input image is transformed into an output image by way of mapping said input image using a focal point,

focal length, direction of vision and a scaling factor. Effectively, the described procedure mathematically transforms input image into Object Space for subsequent projecting onto a flat image, i.e. texture mapping

10. The '584 Patent of the cited prior art does not teach texture mapping of full-surround data as defined in the application. The panoramic data set in the '584 Patent is not consistent with the definition of full-surround data in the application. The panoramic view of the '584 Patent captures limited view data above and below the plane of the panoramic view. The '584 Patent can not capture the visible world, i.e. an approximate hemispherical, 180° world view, and thus differs from the full-surround data in the invention.

11. I am an acquaintance of the inventor, Ford Oxaal, and I hope that he receives this patent. I am further Vice President of Architecture of 3Dlabs Ltd, and I have worked with Mr. Oxaal and the assignee in the past. Additionally, my company may derive financial benefit from the issued patent. Nonetheless, I further declare that all statements made on my own knowledge are true and all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statement and the like is punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and may jeopardize the validity of the present application or any patent issued thereon.

Date: 25/04/06

Signature